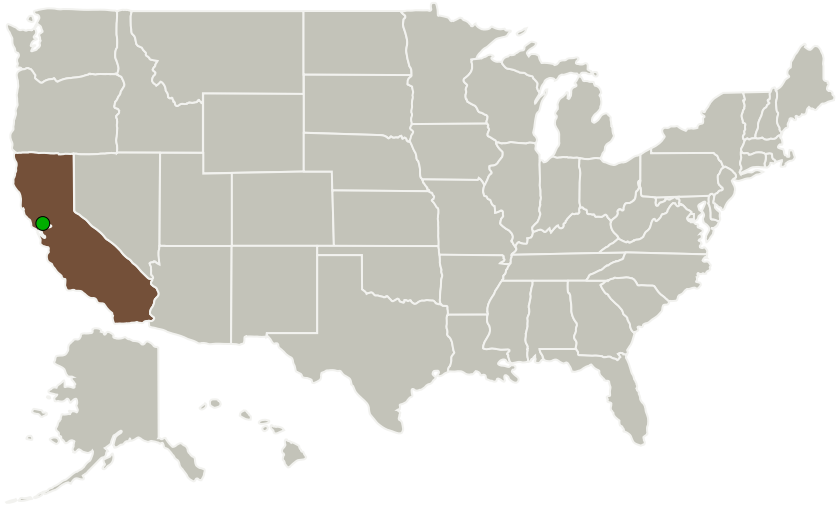
Orbital Fiber Optic Production Module, Phase I

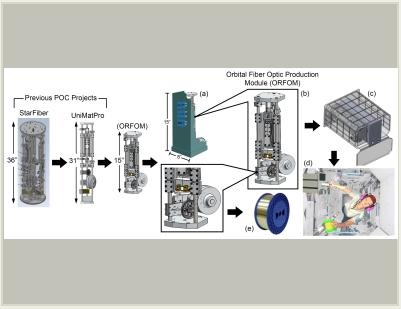
Completed Technology Project (2016 - 2016)

Project Introduction

Physical Optics Corporation (POC) proposes to develop the Orbital Fiber Optic Production Module (ORFOM), which addresses NASA's needs for sustainable space operations and full utilization of the International Space Station (ISS). ORFOM is an orbital scientific payload that will be capable of optical fiber draw in zero gravity onboard the ISS, and specifically "ZBLAN" fluoride glass fiber which is capable of transmission from ultraviolet (UV) to mid-wave infrared (MWIR). When produced on Earth, ZBLAN glass fibers exhibit excessive loss due to crystallization; however, this crystallization can be suppressed in zero gravity. Low down-mass and the high value of low-loss ZBLAN fiber make it an ideal candidate for commercial ISS utilization. During Phase I, we will design and assemble a prototype fiber draw system that will have the size, weight, and power (SWaP) to fit into a NanoRacks ISS payload bay. We will also demonstrate a novel fiber draw process using an in-situ coating and a method to start the fiber draw from a preform that can be used in zero gravity. In Phase I, POC will develop a compact Technology Readiness Level (TRL)-4 version of the ORFOM, and formulate a preliminary Mission Plan, which will be implemented in Phase II. We will also explore commercial applications such as rare-earth-doped fiber for fiber lasers.

Primary U.S. Work Locations and Key Partners





Orbital Fiber Optic Production Module, Phase I

Table of Contents

Small Business Innovation Research/Small Business Tech Transfer

Orbital Fiber Optic Production Module, Phase I

Completed Technology Project (2016 - 2016)

Organizations Performing Work	Role	Type	Location
Physical Optics Corporation	Lead Organization	Industry	Torrance, California
Ames Research Center(ARC)	Supporting Organization	NASA Center	Moffett Field, California

Primary U.S. Work Locations
California

Project Transitions

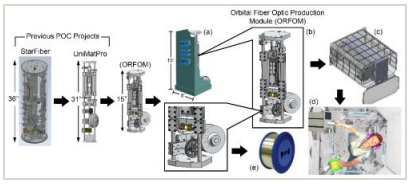
June 2016: Project Start

December 2016: Closed out

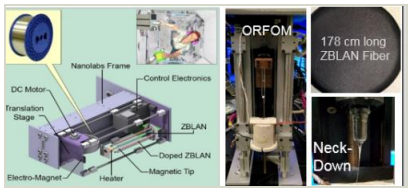
Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139841)*

Images



Briefing Chart Image
Orbital Fiber Optic Production Module, Phase I
(https://techport.nasa.gov/image/131365)



Final Summary Chart Image
Orbital Fiber Optic Production Module, Phase I Project Image
(https://techport.nasa.gov/image/133188)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Physical Optics Corporation

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

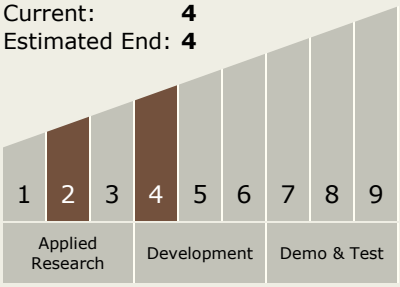
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Kenneth Levin

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Orbital Fiber Optic Production Module, Phase I

Completed Technology Project (2016 - 2016)

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System